

CLAIMS

We claim:

SUB
A 1. A software implemented methodology for determining the pK_a of a molecule of interest comprising the following steps:

- 5 a. determine the hierarchical atom connectivity tree for each ionizable group on each molecule of a series of molecules for which an experimentally determined pK_a is known;
- b. using the partial least squares statistical methodology, extract coefficients associated with each atom type at each hierarchical level;
- 10 c. determine the hierarchical atom connectivity tree for the molecule of interest; and
- d. multiply the number of occurrences of each atom type in the molecule of interest by the PLS coefficient determined for that atom type and sum the resulting multiplications to obtain the predicted pK_a .
- 15 2. The method of claim 1 in which each atom type from the hierarchical atom connectivity tree in steps a and c for each ionizable group on each molecule is placed into a separate bin in a bit string.
3. The method of claim 2 in which the extracted coefficients are associated with the appropriate bin in the bit string.